



Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus¹

This standard is issued under the fixed designation D4355/D4355M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers the determination of the deterioration in tensile strength of geotextiles by exposure to xenon arc radiation, moisture, and heat.

1.2 The light and water exposure apparatus employs a xenon-arc light source.

1.3 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D123 Terminology Relating to Textiles

D1898 Practice for Sampling of Plastics (Withdrawn 1998)³

D4439 Terminology for Geosynthetics

D5035 Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Method)

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

G113 Terminology Relating to Natural and Artificial Weathering Tests of Nonmetallic Materials

G141 Guide for Addressing Variability in Exposure Testing of Nonmetallic Materials

G151 Practice for Exposing Nonmetallic Materials in Accelerated Test Devices that Use Laboratory Light Sources

G155 Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *geotextile*—any permeable textile material used with foundation, soil, rock, earth, or any other geotechnical engineering related material that is an integral part of a man-made product, structure, or system.

3.2 *Definitions:*

3.2.1 For definitions of other textile terms used in this test method, refer to Terminology D123, for geotextile terms refer to Terminology D4439.

3.2.2 The definitions given in Terminology G113 are applicable to this standard.

4. Summary of Test Method

4.1 Five specimens of a geotextile for the machine direction and for the cross machine direction are exposed in a xenon arc device for each of the following times: 0 (control specimens), for 150, 300, and 500 h. The exposure consists of 120-min cycles as follows: 90 min of light only at $65 \pm 3^\circ\text{C}$ uninsulated black panel temperature and $50 \pm 10\%$ relative humidity, followed by 30 min of light plus water spray. (See Note 8.)

4.2 After each exposure period, the specimens are subjected to a cut or ravel strip tensile test. The average breaking strength in each direction is compared with the average breaking strength in each direction of the control specimens. The percent strength retained is plotted versus exposure period to produce a degradation curve for the specimens from each direction.

5. Significance and Use

5.1 This method is intended to induce property changes associated with end use conditions, including the effects of solar radiation, moisture and heat. The exposure used is not intended to simulate the deterioration caused by localized

¹ This test method is under the jurisdiction of ASTM Committee D35 on Geosynthetics and is the direct responsibility of Subcommittee D35.02 on Endurance Properties.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.